Commercialization Analysis & Roadmap

Title: APIs for Online Energy Saving Tools: Home Energy Saver **Date: February 26th, 2013**

CR# 2892

Researchers (PI*): Evan Mills*, Richard Brown

Technology

The culmination of a decade and a half of development by the U.S. Department of Energy's Lawrence Berkeley National Laboratory, the Home Energy Saver (HES) tool-suite provides web-based residential energy calculators for consumers and professionals. HES is a web/cloud-based tool that receives inputs relating to a particular residence and then produces recommendations and estimated cost savings for various home energy improvements. Any homeowner can go to the HES website, enter information about their home, and obtain instant output from HES for free. The homeowner can enter very brief to extremely detailed information.

After inputs are entered, the HES software then performs a series of calculations to produce output in the form of recommendations regarding energy efficiency investments:

YEARLY ENERGY COSTS

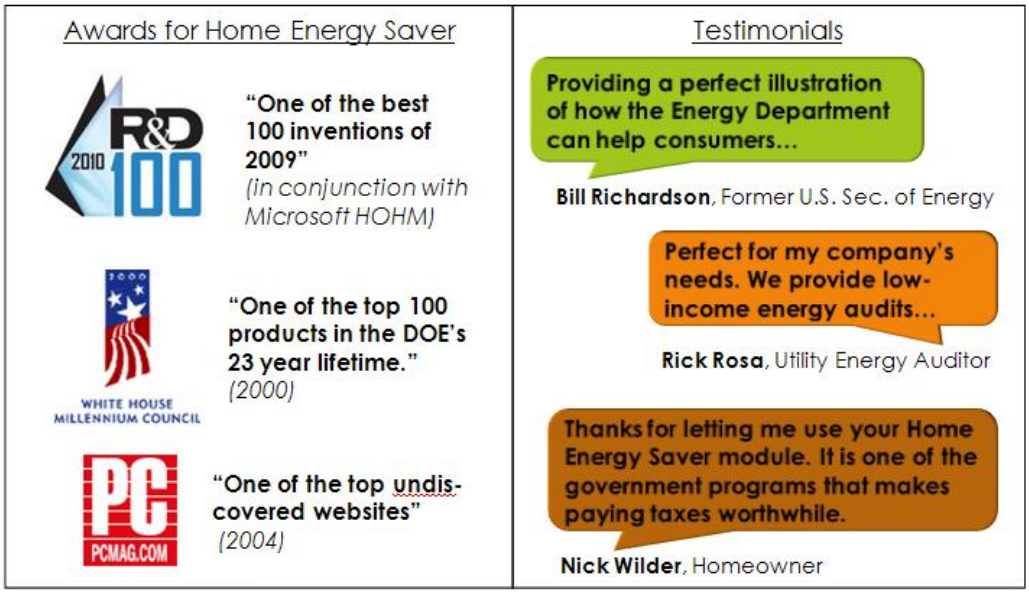
Existing Home	$2,111	
With Upgrades	$1,180	

	Total	Heating	Cooling	Hot Water	Large Appliances	Small Appliances	Lighting
Existing Home	$2,111	$751	$11	$349	$606	$186	$208
With Upgrades	$1,180	$360	$11	$213	$337	$186	$73
Savings	$931	$391	$0	$136	$269	$0	$135

In addition to HES, which provides a simple web-form input / HTML output, LBNL provides the tool in the form of an application programing interface (API). The API format for HES allows for customization and integration with third party websites, so that HES runs invisibly in the background and updates from LBNL researchers will propagate instantaneously.

Awards and Testimonials

Since its inception, HES has won many accolades from across U.S. Energy agencies and regulators. It was recognized as one of the best 100 inventions of 2009, and one of the top 100 products in the DOE's 23 year lifetime. PCMag.com rated the HES website as one of the top undiscovered websites.



Applications

Licensing the APIs for Home Energy Saver enables web developers to create a customized interface that can, for example, collect and save home description information from customers, perform asset ratings, generate summary and drill down reports, and save / recall individual user sessions.

HES web services enable web developers to:

• Collect and save home-description information from customers

• Compute a home's energy use, cost, and carbon footprint on-line in a matter of seconds based on state-of-the-art models and data for any location in the United States

• Perform operational or asset ratings

• Estimate the relative importance of specific end uses (heating, cooling, water heating, major appliances, small appliances, and lighting)

• Get a list of energy-saving upgrade recommendations

• Create a payback-ranked list of energy-efficiency improvements

• Generate a wide range of summary and drill-down reports

• Save and recall individual user sessions

• Design custom interaction and presentation layers

• Generate a Home Energy Score and Label using an approved U.S. Department of Energy methodology

Markets

The current demand for home energy assessment and energy efficiency retrofits falls within the marketplace for "residential energy efficiency information" which complements the offering of disparate products and services. There are several broad categories within this market, as denoted in the figure below.

Market 1: Home Energy Auditors

Smaller residential energy audit companies are natural partners and are already included among those licensees of the HES API. These firms have the capability to enter complex data on home owners' behalf, incorporating the measurements and tests that homeowners are unwilling and/or unable perform themselves, such as HVAC specifications, blower door tests, and thermal imaging. Additionally, these auditors can quickly and easily look up additionally relevant data, such as MLS real estate data, census data, US Geological Survey data, and so on. Lastly, HES provides the potential for these firms to help validate energy efficiency rebates, a major benefit to both the utilities and the homeowners when seeking additional funding or discounts on their energy retrofits.

Market 2: Real Estate Listing Services

To drive adoption of home energy metrics on a broader scale, it is vital to engage with consumers via a more centralized means rather than via one-on-one interactions through the Home Energy Saver website (or any other stand-alone website). Through online real estate listings, buyers, sellers, and realtors in the housing market can drive implementation and adoption of energy usage metrics. Companies such as Trulia, Zillow, MLS and Red Fin allow housing market participants to readily exchange

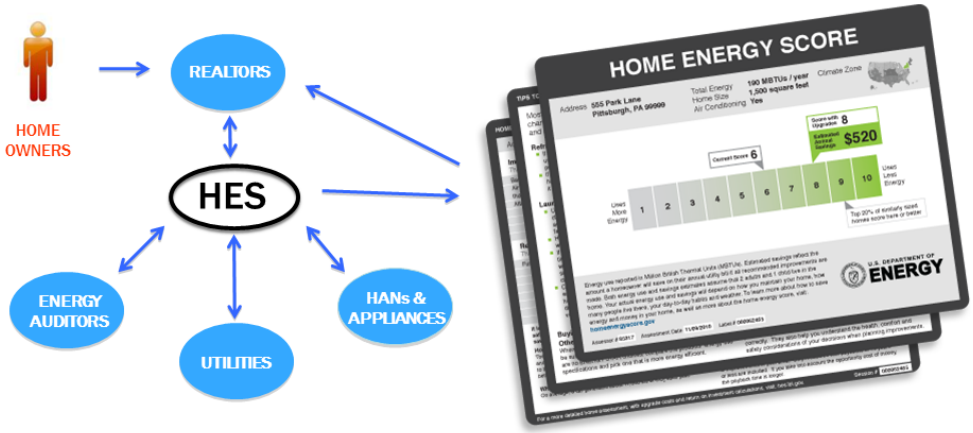
information about housing options, producing more economically efficient markets. Information such as location, housing size, date of construction, and lot size are clearly vital to valuing property. These data points can be easily fed into the HES system, making for logical synergies and integration. More tangential sets of information have now become standard as well: schooling zones, neighborhood safety, and commuting times. The addition of energy performance information to home profiles is clearly of interest as shown by a survey by the Energy Trust of Oregon. 100% of homeowners thought a label could be useful in deciding which home to buy. Realtors believe 65% of home buyers would be "very interested", 89% of realtors thought that the label would give a home for sale a competitive marketing advantage. About 79% would like to see it included in the MLS. Ninety-one percent of builders and developers said that they see themselves using an energy score as a competitive advantage in marketing homes.

Home Energy Score

The Department of Energy and other private organizations have begun creating a standardized measurement and rating program. In June 2010, the DOE's Energy Efficiency & Renewable Energy (EERE) division delivered a Request for Information to energy industry professionals to develop a "National Energy Rating Program for Homes." As of March 2011, the Home Energy Score is being implemented in 10 states, with the largest pilot runs in Oregon and Texas. Over 40 auditors are currently in training. The EERE is currently working with LBNL to continue to test and audit the system, with the hope that this new methodology replaces other energy systems such as the Residential Energy Services Network's (RESNET) Home Energy Rating Service (HERS), which has been an industry standard for some time.

Why would the development of a national, comprehensive metric matter? Players such as the online real estate agents listed above could soon become players in the energy metrics department. In an interview with Zillow, students at the Haas Business School in Berkeley learned that the company had long been considering implementing a standardized score using an online tool such as HES, but it was too resource intensive to do so. For them, while tools such as HES offer a tremendous service and remarkable flexibility, they do not provide the more casual user with a hard-hitting distilled point of data. A national energy rating system would provide that eyeball-catching figure, and would thus drive real estate agents to implement this technology, in turn driving customer adoption of HES-type tools.

Looking into the near future, homes with an energy profile will stand out from those without one. A home with demonstrated low energy use will increase that home's market value. Studies of a home labeling system in Australia have demonstrated that a certified energy efficient home's value may be as much as 10% higher than comparable uncertified homes.

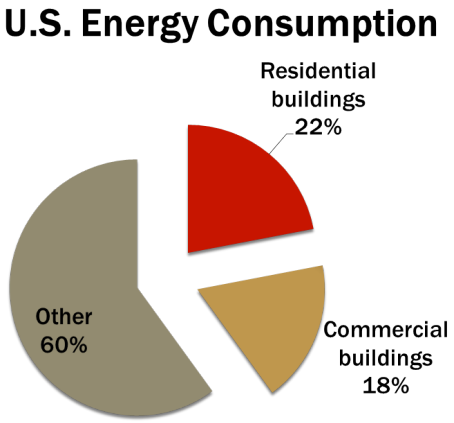


Market 3: Utility Tools / Widgets

Another opportunity for HES is in the area of utility tools and widgets. Utilities can code and embed widgets on their website to engage homeowners. Likewise, retailers could use this information to help drive sales. For example, "big-box" and online retailers could use HES to provide potential customers with more information to justify making home energy investments in appliances or insulated windows, though online services and/or information kiosks in stores.

Driving Forces

Residential home energy use accounts for more than 20% of total national energy use in the United States. There is an enormous market opportunity to reduce residential energy usage, while accruing cost savings to both homeowners and the environment.



The recent economic crisis has created a climate where homeowners are more interested than ever before in saving money by decreasing energy use. The U.S. Department of Energy has also created incentives for homeowners to reduce energy use in existing homes.
The difficulty for many homeowners, however, is gaining information about their own energy usage and about the energy efficiency investments that make the most sense for them. "Will more cost savings

accrue by purchasing new windows or a new refrigerator? If I purchase new lighting, how much will this save off of my monthly electricity bill?"

Intellectual Property

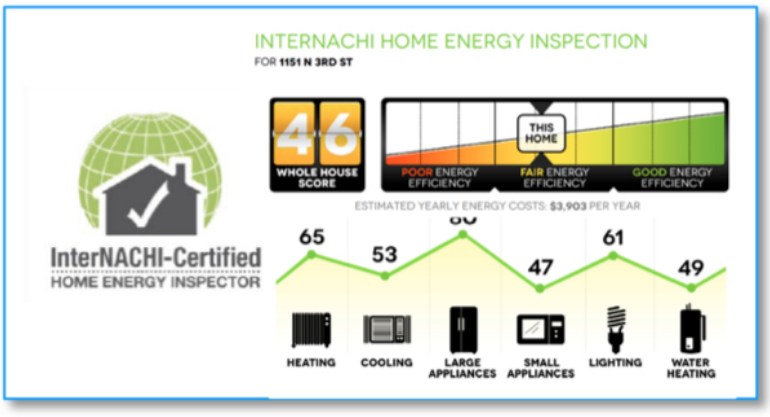
Available for licensing
For more information or to initiate licensing the Home Energy Saver API, e-mail APILicensing@lbl.gov or TTD@lbl.gov

Licensing Strategy

The technology provides a suitable platform for a startup as well as for existing companies to license non-exclusively. Within the first year of their availability, more than 50 entities have become users of the HES APIs, and more than 100 additional entities have formally registered into the system as potential users. Examples of specific third- party implementations follow:

Wattzon has used the HES API to develop their own consumer-oriented web calculator (below), The tool is used as a lead-generator for retrofit projects.

The International Association of Certified Home Inspectors (InterNACHI) has licensed the HES API (below) to develop an energy calculator that their member inspectors can use to advise prospective homebuyers.



Next Steps

To obtain a unique key providing full access to the APIs, please visit <https://developers.buildingsapi.lbl.gov/> click on the Sign Up link. This site provides everything you need to evaluate our APIs, initiate the licensing process, keep current on what's coming from our labs in future releases, track your customers' use, and share your feedback.

Don't hesitate to contact us if you have questions.
--> Questions about Licensing: apilicensing@lbl.gov or ttd@lbl.gov
--> Technical Questions: hesapi@lbl.gov

More info
http://hes.lbl.gov/consumer/ (for homeowners)
http://hespro.lbl.gov/pro/ (for energy auditors, inspectors, contractors)

NOTE: You don't need to have any license to use the Home Energy Saver website: http://homeenergysaver.lbl.gov/consumer/. The API license is only needed for those who want to integrate it into a software tool.

Acknowledgments

This work was supported by the Haas Business School in Berkeley, CA as well as by Evan Mills and Paul Mathew at Berkeley Lab.